United States of America

Preliminary Draft Proposal to WRC-2000

PROTECTION OF 3 AND 10 METER GSO FSS EARTH STATION ANTENNAS IN THE Ku-BAND FROM NON-GSO FSS SYSTEMS

1.0 Introduction

WRC-97 provisionally adopted equivalent power-flux density limits ("provisional limits") in certain Ku-band frequencies to enable sharing between NON-GSO FSS downlink and GSO FSS downlink transmissions. Resolution 130 (WRC-97) requests the ITU-R to conduct the appropriate technical, operational and regulatory studies to determine the further conditions under which co-frequency use of these frequency bands by NON-GSO and GSO systems is feasible. These studies were to be completed in time for consideration by WRC-2000. On this particular issue, the U.S. submitted a protocol statement which was included in the Final Acts of WRC-97 emphasizing that the power limits are provisional, are subject to detailed technical study and review by the ITU-R, and are subject to confirmation by the next competent world radiocommunication conference.

In the two years since WRC-97, ITU-R Joint Task Group 4-9-11 ("JTG") and Working Party 4A have worked diligently reviewing the WRC-97 provisional limits for sharing between GSO FSS and NON-GSO FSS systems. As a result of this intense work, the JTG reached consensus in many areas, including the $EPFD_{down}$ limits to protect smaller GSO FSS receive earth station antennas (i.e., diameters of 60 cm and 120 cm) from NGSO satellite downlink transmissions. However**,** the JTG could not reach agreement on the $EPFD_{down}$ limits needed for protection of 3 meter and 10 meter GSO FSS earth station antennas and, instead, identified the two $EPFD_{down}$ masks that were heavily debated. These masks are included as curves A and B in the Draft CPM Report, Section 3.1.2.1.4.c). While there was majority support for curve A, others, including the U.S., supported the view that curve A would not provide adequate protection for some GSO FSS carriers and that curve B should be adopted.

This document provides the United States of America's preliminary draft proposal to WRC-2000 regarding the $EPFD_{down}$ limits for protection of 3 meter and 10 meter GSO FSS earth station antennas. CITEL administrations may wish to consider this proposal as a basis for common CITEL views and/or proposals.

At the same time, we note that the Federal Communications Commission within the U.S. has an on-going process addressing domestic service rules and associated licensing matters for NON-GSO FSS systems.

2.0 Discussion

The U.S. was intimately involved in the work of the JTG and, since the conclusion of the JTG, has carefully re-examined all of the JTG technical input and output documents. As a result, we have verified that the co-frequency operation of NON-GSO FSS systems will have an impact on both existing and planned GSO FSS systems. Studies carried out within the JTG and our own independent analyses reveal that there is some merit to concerns expressed by both the GSO and NON-GSO proponents. We believe that , under the appropriate conditions, co-frequency operation of both NON-GSO and GSO systems will be enabled.

During the course of the JTG the impact of many proposed $EPFD_{down}$ masks, including the WRC-97 provisional limits, was evaluated. We firmly believe that it is now necessary to

reach a decision on this very important matter. Any further delay would jeopardize the ability of consumers worldwide to benefit from the broadband interactive services offered by the new NON-GSO FSS technology. As a result of the studies, it is now possible to confirm the provisional limits from WRC-97. Thus, the U.S. is prepared to remove its reservation from the Final Acts of WRC-97 and support the provisional limits for the 3 meter and 10 meter antennas in the 10.7-11.7 GHz, 11.7-12.2 GHz (Region 2), 12.2-12.5 GHz (Region 3), and 12.5-12.75 GHz (Regions 1 and 3) frequency bands. We note that the WRC-97 provisional limit points fall between curves A and B discussed above.

Table 1 below provides the single entry limits to protect 3 meter and 10 meter GSO FSS receive antennas

$EPFD_{down}$ limits for protection of 3 meter and 10 meter GSO FSS antennas

Table 1

Frequency band (GHz)	**$EPFD_{down}$ dB(W/m^2) Single-Entry**	**Percentage of time during which $EPFD_{down}$ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter, and reference radiation pattern[1]**
10.7-11.7; 11.7-12.2 in Region 2; 12.2-12.5 in Region 3 and 12.5-12.75 in Regions 1 and 3	-182	99.9	40	3 m, Rec. S.[4/57]
	-176	99.97	40	
	-163	99.999	40	
	-160	100	40	
	-185	99.97	40	10 m, Rec. S.[4/57]
	-168	99.999	40	
	-160	100	40	

[1] Under this Section, reference patterns are to be used only for the calculation of interference from NON-GSO FSS systems into GSO FSS and BSS systems.

The aggregate $EPFD_{down}$ limits are derived from the single-entry limits using the conversion factor of 3.5 agreed upon within the JTG. Due to the monotonic nature of the NON-GSO downlink emissions, interpolation between these points is dependent on the specific NON-GSO FSS constellation and emission characteristics. GSO systems would be protected by validating only the above points rather than an entire $EPFD_{down}$ mask. Further, the U.S. supports the agreement reached at the JTG regarding use of the new GSO earth station antenna reference pattern contained in Rec. S.[4/57]. This pattern provides approximately 3 to 5 dB more relief to NON-GSO systems than ITU-R Recommendation S.465-5 specified by WRC-97.

2.0 Conclusion

The U.S. has closely followed the work of the ITU-R in regards to the implementation of the new NON-GSO FSS service and the protection of GSO FSS from NON-GSO FSS. After carefully assessing the output from the JTG, and in order to accommodate NON-GSO FSS, the U.S. has re-evaluated the $EPFD_{down}$ limits necessary to protect its 3 meter and 10 meter GSO FSS receive antennas. The preliminary draft proposals contained in this paper, which are significantly relaxed from the U.S. input document to the JTG, represent the $EPFD_{down}$ limits necessary to protect 3 meter and 10 meter GSO FSS receive antennas. The U.S. firmly believes that it is now necessary to reach a decision on this very important matter for WRC-2000.
